

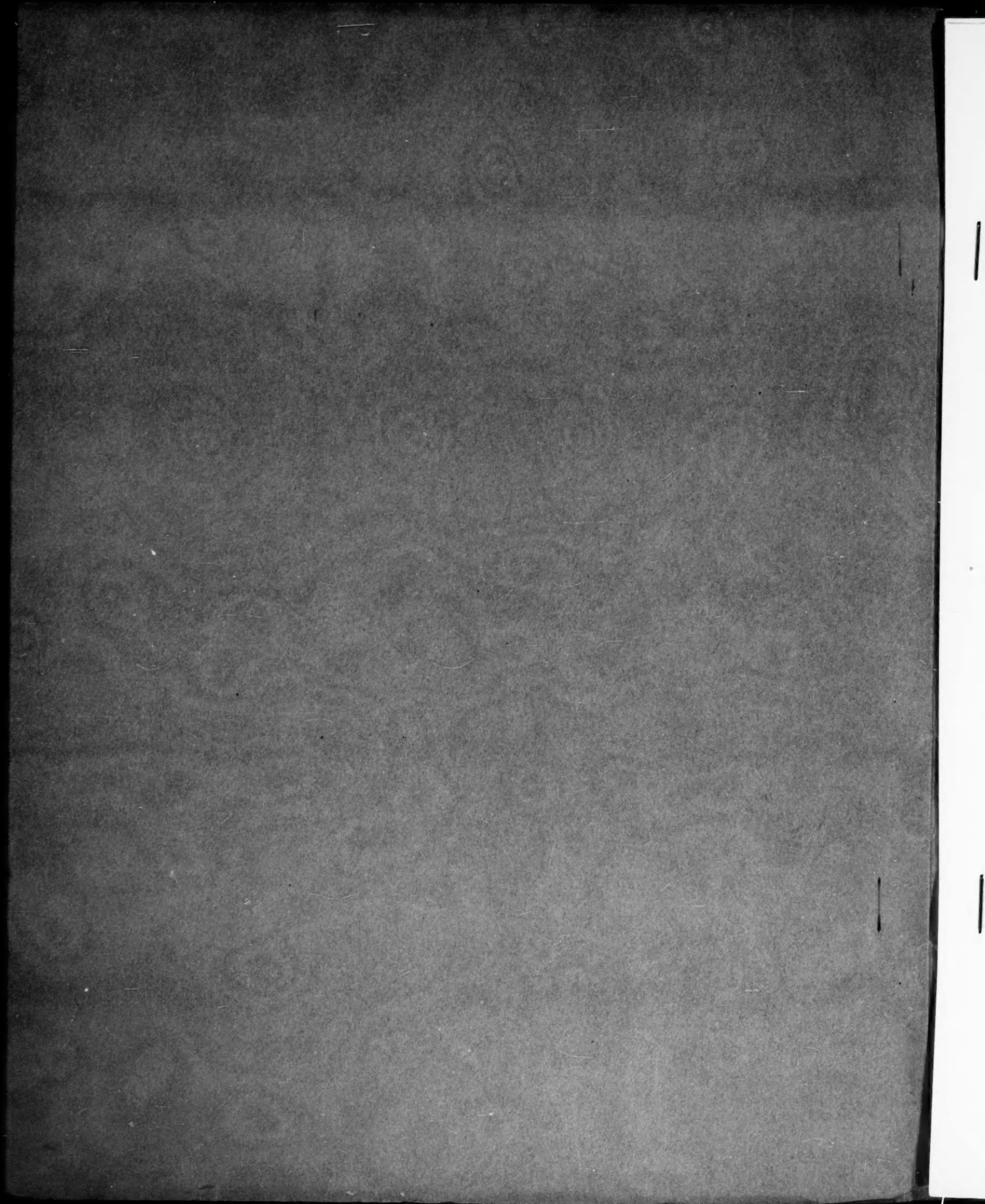
AGRICULTURAL NEWS LETTER

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This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations by the du Pont Company. It also contains published reports of investigators at agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.





AGRICULTURAL NEWS LETTER

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SLURRY METHOD NOW RECOMMENDED FOR TREATING VEGETABLE, PEANUT, MELON,
PUMPKIN, RICE, SOYBEAN, AND SORGHUM SEEDS WITH "ARASAN" SF

The slurry method, first used last year on a commercial scale for treating seed corn, is now being recommended for disinfecting vegetable, peanut, pumpkin, melon, rice, soybean, and sorghum seeds, to control various seed-borne and soil-borne diseases.

The slurry method for these seeds involves application of "Arasan" SF seed disinfectant and protectant to the seed in the form of a water suspension or slurry of the consistency of ordinary buttermilk, instead of the conventional powder. The active ingredient in "Arasan" SF is 75% tetramethyl thiuramdisulfide. This is the same chemical which has already demonstrated its effectiveness as a dry disinfectant and protectant under the trade-mark "Arasan."

The development of the slurry method for treating seed corn necessitated the designing and construction of a special machine for applying the chemical to the seed. This device, developed by the Du Pont Semesan Division and called the slurry treater, synchronizes the flow of the seed and the slurry so that every bushel of seed receives the same accurate dosage of chemical.

Each Variety Given Exhaustive Tests In Treater and Growing Trials

In developing the new recommendations, the vegetable and other seeds have been tested for several years, and each variety has undergone exhaustive tests in both the treater and growing trials.

The Du Pont Semesan Division, in a recent letter to the trade, includes a table giving information covering the correct seed gate, size of slurry buckets, and concentration of slurry to be used for each of the following seeds: bean (lima, string, and garden), beet (garden), broccoli, Brussels sprout, cabbage, cantaloupe, cauliflower, collard, corn (field and sweet), cucumber, endive, kale, kohlrabi, lettuce, mustard, pea, peanut (Spanish), pumpkin, radish, rice, spinach, soybean, sorghum, squash, Swiss chard, tomato, and turnip.

Nylon Brush Agitator for Seeds Subject to Cracking of Seed Coat

The letter says that particularly in the treatment of seeds subject to mechanical cracking of the seed coat, "it may be desired to substitute a spiral brush with nylon bristles for the shaft and paddles in the mixing chamber. The results of preliminary tests indicate the brush is apparently non-injurious to the seeds. A further advantage of the brush is that it prevents the collection of seeds and chaff on the bottom and sides of the mixing chamber."

Continued on next page

Du Pont plant pathologists and engineers say that to treat the listed seeds properly with "Arasan" SF, a specially prepared powder to which water is added to form the slurry, it is essential that the correct seed gate, size of slurry bucket, and concentration of the disinfectant be employed.

"In many cases the slurry treater will not operate at all unless the proper seed gate is used," they point out. "Use of the wrong size of slurry bucket may result in underdosing of the seed or overdosing it and leaving it too wet. However, if the slurry treater is provided with the proper equipment -- gate, bucket, and slurry concentration -- it will treat seeds rapidly, accurately, and uniformly, with safety to seeds and workmen. In fact, the slurry method eliminates flying dust during treating operations. Ventilation or dust exhaustion will not be needed, and it will not be necessary for workmen to wear masks."

NOTE: Further information regarding the slurry method, including the table giving necessary information for treating the various seeds listed, will be sent on request. Address, Editor, Du Pont "Agricultural News Letter," Wilmington 98, Del.

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REALISTIC FISHING LURES MADE OF NEOPRENE

Fishermen can now get durable lures made of neoprene. These artificial "bugs" give the fly-caster the advantage of lifelike bait with the ease of handling of artificial flies. These new lures of Du Pont-made rubber resist the principal enemies of natural rubber -- sunlight and aging.

All the new lures have flexible, hollow bodies. This makes them easier to handle, and does not interfere when the fish strikes. The coal-black crickets, made in two sizes, are sufficiently lifelike to fool the craftiest trout or bass. The grasshoppers, in three sizes, have accurately shaped and correctly colored bodies. Their ready-to-jump position adds to their realism. The stone flies in the nymph state, in three different colors, have flat, segmented bodies, shaded darker on top than on the underside. The flexible legs and tail give this lure a most realistic appearance. Name of manufacturer will be sent on request. Address Editor, Du Pont "Agricultural News Letter," Wilmington 98, Del.

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NYLON FOUND TO BE SUPERIOR AS A BOLTING AND FILTER CLOTH IN REFINING CORN

By V. S. Peterson

Much of the hundred and forty million or more bushels of corn ground by the wet corn milling industry in this country each year is sieved and filtered through nylon fabric.

Early in World War II, corn products manufacturers who use the yield from more than two million acres of the best Midwest farmlands, began to experiment with nylon as a bolting cloth.

They found that nylon's great strength and resistance to abrasion and deterioration when wet, made woven bolting cloth that lasted many times longer than the silk formerly used.

Clinton Industries, Inc., of Clinton, Iowa, took the lead in testing nylon bolting cloth. This company wet mills shelled corn to make various grades of corn syrups, corn starches, crude and refined corn sugars (dextrose), refined edible oils, lactic acid, and livestock feeds. It processes about 27 carloads (45,000-50,000 bushels) of normal-moisture shelled corn daily. This represents the yield of about a thousand acres of good Corn Belt land processed each working day, and totals many millions of bushels from many thousands of acres in a year. It also uses about eight carloads of coal and several carloads of chemicals and other supplies each day. All of this raw material makes up a good-sized freight train per day for this company alone.

Nylon Cloth Used on Reels and Shakers In Starch-Separating Process

Recently the writer visited the huge plant of Clinton Industries, Inc. He saw how the milling process separates the starch from the kernel, and how the starch is made into syrups and other corn products. He was shown the early steeping, de-germinating, and grinding steps, and how the wet suspension separated from the coarse bran is passed over a series of reels and shakers that sieve out the grits and fibers. He learned at first hand how nylon enters the picture at this point.

The reels are large six-sided tubes covered with nylon bolting fabric. They are about 10 feet long, open at each end, and tilted. The wet suspension is pumped from tanks into the upper end. The revolving reels constantly pick up and drop this material as it passes through. Water washes the gluten and starch mixture through the nylon bolting cloth covering the reel. The particles of grits and fibers tumble on toward the lower end.

Continued on next page

The shakers are rectangular sieves with bottoms of fine nylon bolting cloth. They are rapidly shaken back and forth to separate the last bits of grits and fibers from the dispersed starch and gluten. The small, hard, unground particles splash about on the surface, but do not pass through the nylon fabric. This residue is washed to recover the adhering starch, and is later dried as a constituent of corn gluten feeds. The operator occasionally wets the contents of the shaker with a water spray from an ordinary hose to keep open the fine perforations in the cloth. The thin water suspension of starch and gluten passes through the nylon bolting cloth into collecting flumes below.

This so-called mill starch is then taken from the collecting flumes and run onto long tilted tables. The starch granules, being heavier than the gluten, settles and accumulates on the tables while the separated gluten particles flow off the end of the table. The starch is removed periodically, washed on continuous filters clothed with nylon filter cloth, dried, and prepared for market, or further processed into special starches, thin-boiling starches, gums, dextrans, corn syrup, crude corn sugar, or refined corn sugar of which hydrol is a by-product. Oil, refined for edible salad and cooking use, and corn gluten feed and meal for livestock feeds are recovered as other products.

A booklet explaining the milling process, reviewed briefly above, will be sent upon request. Address Clinton Industries, Inc., Clinton, Iowa.

In the future, corn cobs will be one of the important raw materials used in making the very nylon bolting cloth, discussed above, used for wet sifting in wet corn milling.

Corn cobs and other cellulosic farm by-products such as cottonseed hulls, and the hulls or bran of oats and rice, are sources of a chemical known as furfural, which can be converted into adiponitrile, a chemical important in making nylon yarn and nylon plastics.

#####

RESEARCH DEVELOPS COLOR SCHEMES FOR SCHOOL INTERIORS

For nearly twenty years, the Du Pont Company has been engaged in color research. Its paint specialists have collaborated with prominent lighting and color consultants in studies to perfect color schemes for specific uses.

The company has chosen practical color combinations for class and study rooms, recreation rooms, libraries, auditoriums, cafeterias, lobbies, corridors, and stairways, as well as for factories and special work rooms.

More Cheerful, Comfortable, and Safe Environment

Correctly applied, the right color combinations for school rooms result in a more cheerful, comfortable, and safe environment for both students and teachers.

The following information is included here so that educators and others may be advised of the advantages of this new, scientific method of properly placing colors on a surface to reap maximum benefits. The applications discussed in the following pages will be of special interest to many agricultural and home economics workers, particularly vocational teachers, extension specialists, farm and home demonstration agents, agricultural engineers, and others whose advice may be requested in connection with "Color Conditioning" the interiors of schools, both rural and urban.

Educators and others wishing more detailed information can obtain a copy of Du Pont's booklet, "Color Conditioning -- A Tested Scientific Color Plan for Educational Institutions," by writing the Editor, Agricultural News Letter, Du Pont Company, Wilmington 98, Del.

"COLOR CONDITIONING" OF SCHOOLS HAS MANY FUNCTIONAL ADVANTAGES

The use of carefully selected colors in schools is a relatively new aid in the science of teaching. Because of their important psychological and physiological effects, colors should be selected for their functional advantages rather than for their decorative purposes alone.

Three Important Reasons for Using Color in the School

Important reasons for using color in painting the modern school include:

1. Color stimulates the senses or produces a soothing effect on the student, whichever is desired. For example, if a room is apt to be too cool, warm colors will make it seem warmer. Conversely, cool colors make warm rooms seem cooler.
2. Color schemes used in a series of rooms make for greater cheerfulness and variety throughout the entire building.
3. Color increases efficiency of staff and students, as it provides a more comfortable, scientifically established visual environment.

Since the end to be achieved is functional, the colors used in schools differ from those usually employed in interior decoration, but still result in a good appearance.

Special Colors for Specific Purposes Recommended

White Best for Ceilings -- Because ceilings represent the most important of all light-reflection surfaces, Du Pont finishes experts recommend white in areas where good seeing is required. Exceptions are made for different rooms on the basis of varying activities.

Peach is Friendly and Appetizing -- Peach is a friendly color. Because it is also a very appetizing color, peach can be used to advantage in rooms where food is served. Being slightly warm in tone, it is ideal for rooms normally cool, or to compensate for cool colors where they are felt desirable. Du Pont suggests a color slightly grayish in tone, neither yellowish nor too pinkish. Du Pont CC Medium Gray provides excellent contrast as well as a practical color for use on the dado or lower part of the wall. Du Pont CC Tan also makes an excellent trim color.

Sunlight Color Simulates Effect of Real Sunlight -- Sunlight color is bright and cheerful, and compensates for lack of natural light. Used in comparatively dark and vaulty spaces, Du Pont CC Sunlight will simulate the effect of natural sunlight. It should not, as a rule, be applied to small

Continued on next page

spaces where critical seeing tasks are performed -- for yellow as a color is sharply focused by the eye. Being high in energy, it is ideal for halls, stair wells, and gymnasiums. It should be used with discretion in class rooms, but has a good application as an end-wall treatment in many places.

Ivory Reflects Light -- Develops Feeling of Warmth -- Ivory will suitably color average spaces where a high degree of light reflection is desired. Being warm and mellow in tone, Du Pont CC Ivory will "Color Condition" a room on the warm side, and compensate for relatively low temperatures. It is ideal for storerooms, laboratories, vaults, and areas deprived of natural light, and for large interiors that require a fairly aggressive color. Du Pont CC Deep Rose, also being a warm and pleasing color, provides an excellent contrast on the dado. Du Pont CC Tan is also a good dado color to use with ivory, sunlight, and peach.

Blues Are Cool Colors -- Preferred by Most Men -- Du Pont CC Blues offset glare by reducing the brightness of wall areas, and establish a pleasing and restful environment on the cool side. Blues have functional value in helping to offset fatigue brought about by exposure to relatively high temperatures. Because blue ranks foremost in the preference of most men, it is highly desirable in rooms occupied by them. It is suitable for conference rooms, reception rooms, and entrance lobbies. Variations are ideal as an end-wall treatment, as well as for a dado.

Grays Are Utility Colors -- Sequences of Du Pont CC Grays break up monotony, and assure change of pace throughout a series of rooms. They are cool, restful, and passive in quality, and will prove particularly effective if used in rooms that lead into other spaces where green, ivory, or peach is found.

Greens Are Easy to Live With -- Du Pont has three CC Greens, perfected scientifically in hue and brightness to serve a variety of purposes. Being subtle in tone, neither greenish nor bluish, they are easy to live with, and ideal for rooms occupied over long periods of time. Because green is a receding color, it tends to increase the apparent dimensions of the average room. It is the most popular of all colors for class rooms as the eye is accustomed to this color. Du Pont Green is the direct complement of human skin. It tends therefore to enhance the complexion and to create an appealing environment.

Plan for Functional Results Rather Than Mere Appearance

While any harmonious display of color will please most persons, certain hues are far better than others. The job in a school is to work objectively to plan for functional results rather than mere appearance. The color that is best is one that achieves the most success, regardless of whether it happens to agree with anyone's personal notion or fancy.

#####

NEW INSECTICIDE CONTROLS PRACTICALLY ALL INSECTS THAT ATTACK COTTON

The Du Pont Company has developed a single insecticide that combines the killing action of several chemicals to control practically all important insects that attack the cotton crop. Such a material has long been a dream of harried cotton farmers.

The new insecticide is Du Pont's Cotton Dust No. 10, a product used for the first time this year by growers throughout the Cotton Belt. The successful performance of this new mixture was previously studied by entomologists and others interested in verifying results of preliminary, favorable smaller-scale tests.

Includes Hexachlorocyclohexane, DDT, and Sulfur

The combination includes the new insecticidal chemical called hexachlorocyclohexane (sometimes referred to as benzene hexachloride), DDT, and sulfur, each of which kills some but not all of the many economic insect pests that severely damage the cotton crop each year.

The hexachlorocyclohexane is highly effective against the boll weevil, fleahopper, leafworm, aphids, and several species of plant bugs. This particular chemical, however, does not kill certain other insects, including the cotton bollworm which in some seasons in some areas ruins the crop after it has been successfully protected against other pests. It takes the DDT in the mixture to deal successfully with the bollworm.

The sulfur is included in the mixture because it has some value against mites and the fleahoppers. Then, too, the sulfur is considered beneficial to cotton growth.

Easily Applied With Ordinary Dusting Equipment

The new cotton dust is formulated so that it can be applied with ordinary ground or airplane dusting equipment. Between 10 and 15 pounds are applied per acre three or four times at five-day intervals during the same period farmers usually dust their cotton with calcium arsenate.

Drift to food crops near cotton plantations should be avoided because of possible undesirable residues, and also because the hexachlorocyclohexane in the mixture possesses an objectionable odor and its application to certain crops leads to development of undesirable taste in the plants.

The exact range of usefulness of this new mixture on crops other than cotton is still under investigation.

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PLACE OF UREA IN COMMERCIAL CATTLE AND DAIRY FEEDS

"The large amount of research background and widespread commercial use during the past few years give adequate testimony that, when properly blended with other feedstuffs, urea has a high nutritional value for ruminants, such as cattle.

"If the livestock of the United States are to be fed at protein levels even partially meeting the recommendations of many animal husbandrymen, the overall supply of protein feedstuffs in sight may not be adequate."

"Two-Sixty-Two" Can Help Extend Overall Protein Supply

"We feel that 'Two-Sixty-Two' feed compound, which supplies urea and small amounts of other feed ingredients in satisfactory physical condition for feed-mixing use, can fill a sound nutritional and economic function in helping to extend the overall protein supply toward better feeding levels.

"Just exactly how, in what specific cattle and dairy feeds, cattle pellets, and the like, will depend on developments. Prof. H. M. Briggs of Oklahoma A. and M. agricultural experiment station at Stillwater, has shown that a 42 per cent range pellet in which one-fourth of the protein was obtained from 'Two-Sixty-Two' did a satisfactory job of winter range supplementing.

"Feed manufacturers whose supply of cottonseed for cube manufacture is limited can blend in some grain and 'Two-Sixty-Two' to turn out 25 per cent more pellet tonnage.

"To those faced with long hauls to cattle, it may be worthwhile to consider producing a 45 per cent or 50 per cent concentrate from 40-42 per cent meal. This might fit well into geographic situations or better meet local customs-mixing requirements." --Excerpts from talk by Dr. F. G. Keenen, Du Pont Ammonia Department, before Oklahoma Cottonseed Crushers' Association.

UREA AS A PARTIAL PROTEIN SUPPLEMENT IN DAIRY AND CATTLE FEEDS

The rumen, possessed only by cattle, sheep, and other cud-chewing animals, gives these ruminants a distinct nutritional advantage over animals such as swine and poultry that are not so equipped.

This rumen or paunch is a large fermentation vat literally alive with billions of little "bugs" that act as "digestion assistants." They do a lot of mysterious but helpful things to the feed when it reaches the rumen.

These little animals, called micro-organisms by bacteriologists, "chew up," rebuild, and transform the "natural" proteins of alfalfa, cottonseed meal, and other such feed ingredients. And, as an even more surprising bit of helpful rearranging and rebuilding, the micro-organisms in the rumen also tear apart any of the chemical compound known as urea or carbamide they may come across in the feed. They divide the urea into ammonia and carbon dioxide. Then, after quickly absorbing the ammonia into their own bodies, they go about the business of building it up into useable protein forms right along with the other units from the "natural" proteins.

Chickens and pigs and other non-ruminants, not having a paunch inhabited by myraids of helpful micro-organisms, get no nourishment from urea in the feed. It merely passes through unchanged and without harm to the animal or fowl, but with no nutritional value.

But, the rumen-equipped animal -- the cow, the sheep, even the goat -- gets the wide variety of useful protein forms it needs to grow meat, bones, hair, and horns: and -- of obvious importance to the dairy cow -- to produce milk.

Dr. F. G. Keenen of the Du Pont Ammonia Department recently said the tearing down and rebuilding process in the rumen is similar to "tearing down a brick wall and rebuilding the individual bricks into a house."

Urea Used In Two Million Tons of Feed In Past 3 Years

The practical importance of the ability of the rumen micro-organisms to do this specialized job is indicated by the fact that about two million tons -- that's four billion pounds -- of commercial feeds, mostly for dairy cattle, had some urea in them in this country during the past three years. More would have been used had it been available as a feed compound.

Protein Digestion by Ruminants

Dr. Keenen recently told the Oklahoma Cottonseed Crushers' Association at Sulphur that, even before the German chemist Wohler had first synthesized urea in his laboratory 115 years ago, urea had been isolated in small amounts from urine, and was recognized as being related in some way to the process of protein digestion by animals.

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"We know that proteins are complex chemical compounds of nitrogen, and are made up of similar units called amino acids," he said. "When proteins are eaten by animals, the digestive processes first break them into these smaller units which are subsequently rearranged into new complex structures of more specific use to the animal. The cottonseed-meal protein eaten by a steer is rearranged in part into animal protein in the form of steaks for us and meat scraps for chickens. To accomplish this, the original protein is torn down into its small units -- amino acids -- and then rebuilt."

"Two-Sixty-Two" Came Into Being Under Wartime Pressure

Dr. Keenen explained that during World War II an acute protein shortage developed. Du Pont had kept informed of, and had actually participated in, the large amount of experimental feeding work with urea conducted between 1935 and 1942.

However, due to the rapidly increasing demands on its urea production, the company felt it had to postpone any interest in the feed outlets for urea until after the war, or until it had increased capacity to take care of this new market. But the protein shortage simply would not wait. Du Pont was given short notice by the War Production Board in October, 1943, to begin supplying some of its scarce urea to the commercial feed industry. A group of research men immediately set to work, however, to develop and produce a commodity more suitable for use in feeds.

"After selling crystal urea for feed for about five months, -- by April, 1944 -- we had developed 'Two-Sixty-Two' feed compound, a product much better adapted to feed-mixing operations than crystal urea had been," he said.

"Two-Sixty-Two" feed compound contains crystal urea, plus small amounts of other feed ingredients. It is processed to maintain satisfactory physical properties for feed-mixing use. The per cent of protein in a feedstuff is obtained by multiplying the amount of nitrogen in it by 6.25. "Two-Sixty-Two" contains 42 per cent nitrogen. This multiplied by 6.25 gives an equivalent protein value of 262 per cent; hence, the origin of the name adopted for the feed compound.

"Working with percentages greater than 100 per cent is rather confusing," Dr. Keenen admitted. "It seems a little more workable to say one pound of 'Two-Sixty-Two' is equivalent to 2.62 pounds of protein, provided it is accompanied by adequate carbohydrate to maintain proper nutritional balance".

Research Develops Valuable Information

He mentioned various intensive studies of urea utilization by calves, milk cows, and other ruminants at the agricultural experiment stations in Wisconsin, Massachusetts, Illinois, Hawaii, Oklahoma, Nebraska, Kansas, and abroad.

Continued on next page

"From all of this nutritional research has emerged a reasonably clear picture of the way in which urea is converted into protein during digestive processes," he said. He added that one of the most direct bacteriological studies of this process was made by Pearson and Smith at the Hanna Dairy Research Institute in Scotland around 1942.

"These investigators added urea to portions of the rumen contents which they removed and incubated at body temperatures for several hours," he explained. "From their observations they concluded that at least 25 per cent of the total protein requirement of a milk cow producing 25 pounds of milk daily could be synthesized from urea by the micro-organisms present. Urea as such is not absorbed by the animal, nor is it a 'synthetic protein'. It is a nitrogenous raw material which micro-organisms in the rumen can work into the bacterial protein that they build up from other parts of the ration. In this way, the nitrogen from the urea supplements the nitrogen supply from other sources".

Dr. Keenen said practically all feeding experiments with "Two-Sixty-Two" have indicated that "not more than one-third of the total protein nitrogen requirement should be obtained from urea".

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NEOPRENE GLOVES, REINFORCED WITH CORRUGATED PATCHES, HELP GUARD
AGAINST SLIPPAGE IN DAIRIES, CANNERIES, AND SIMILAR INDUSTRIES

Neoprene gloves, reinforced with special corrugated neoprene patches on thumb, fore finger, index finger, and palm, are now being made to guard against slippage in the handling of materials and machinery.

The corrugation, which also covers the ends of the first two fingers and the thumb, provides the right amount of traction in key spots for firm, safe gripping by workers in dairies, canneries, and similar food-processing and food-handling industries.

The patches also give double thickness at points of hardest wear, thus adding extra wearing life to the gloves. The patches do not come off because, uncured when first attached, they are cured along with the glove body itself for permanent adhesion.

Neoprene gloves, whether reinforced or plain, resist oil, grease, and chemicals. The reinforced type is available in light tan color, with curved or straight fingers.

NOTE: Name of manufacturer will be sent on request.
Address the Editor, Du Pont "Agricultural News Letter,"
Wilmington 98, Del.

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HOW TO COMPUTE FEED REQUIRED FOR ONE HEN FOR ONE YEAR

Over and above the feed needed for body maintenance and activity, a hen requires about 1 pound of dry feed for each 7 eggs laid, according to studies at the University of Illinois College of Agriculture.

Dr. L. E. Card of the Illinois Experiment Station, says a hen laying 140 two-ounce eggs in a year needs for egg-laying alone about 20 pounds of dry feed beyond her requirements for all other purposes. A hen laying 105 eggs needs only 15 pounds of extra feed, while one laying 280 eggs needs about 40 pounds.

"High egg production clearly takes more feed, but just as clearly the feed brings a greater return in terms of eggs than the same amount fed to low-producing hens," Dr. Card says.

He explains that to compute the total feed required for one hen for a year:

Multiply the live weight of the bird, in pounds, by 8.

Add 25.

Divide the total number of eggs the hen lays

by 7 (e.g. 105 divided by 7 equals 15), and add this figure to the total obtained by the first two steps.

Example

Weight of hen -- 5 lbs.

5 x 8 equals 40; 40 plus 25 equals 65.

Hen lays 105 eggs per year. Divide this figure by 7. Result 15

Total feed required -- 80 lbs. (65 + 15)

AMERICAN HEN LAYS 154 EGGS ANNUALLY NOW COMPARED WITH 134 IN 1940

The American hen today is responding to better care and management by laying 15 per cent more eggs annually than she did at the beginning of World War II.

This remarkable rise in annual egg production per bird from an average of 134 in 1940 to 154 now is due largely to the increase of better breeding stock, employment of sound management techniques, advances in disease control, and greater use of scientifically balanced feeds.

Such is the conclusion reached by poultry nutritionists and other authorities, who point out that this new record was accomplished despite many war-imposed shortages that necessitated constant changing of formulas to maintain feeds in proper nutritional balance.

Amount of Feed Needed to Produce Dozen Eggs Greatly Reduced

A recent Du Pont publication, "New opportunities for Poultry Raisers," analyzes the unprecedented increase in egg production, which has risen steadily during the war and post-war years.

It quotes Dr. T. C. Byerly, senior poultry husbandman, U. S. Department of Agriculture, as follows: "About 12.5 pounds of feed were required to produce a dozen eggs at the 1925-27 fall rate of lay, while only about 9 pounds per dozen were required at the 1943-45 fall rate. At present feed prices, this represents a drop in cost of production of about 14 cents per dozen."

Egg Production Up -- Mortality Down -- In Laying Tests

The booklet says that in egg-laying tests throughout the country many new records have been established for various breeds between 1939 and now. It adds: "The average egg production in egg-laying tests in 1939 was 194 eggs, and mortality of hens was 20.13 per cent. Since then, the egg production at laying tests has risen to 208 eggs and the mortality decreased to 14.56."

Ohio Experiments Show Importance of Vitamin D in Balanced Ration

Tests at the Ohio Agricultural Experiment Station are cited to show the importance of scientific feeding of balanced diets.

"Experiment station workers in Ohio recently reported that when a test flock of 50 Rhode Island Red pullet layers were given vitamin D₃ in addition to their regular grain ration, their rate of lay rose from 23 per cent to 54 per cent in two weeks," the pamphlet says. "Further, the eggs produced by this group changed from weak-shelled eggs with a breakage test of 71 per cent

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to strong-shelled eggs with a breakage test of only 15 per cent. Also, the weight of the eggs increased more than 5 ounces per dozen. The vitamin D₃ used in the tests was supplied by 'Delsterol' 'D'-activated animal sterol."

Special Nutrients Furnished In Poultry Mash

The special nutrients not found in farm grains are commonly and most easily supplied in a mash mixture.

"Thanks to nutrition research and to the commercial production of synthetic nutrients such as riboflavin and 'D'-activated animal sterol, there is being produced today a tremendous tonnage of manufactured feeds which are nutritionally more complete and more effective than the very best rations which could be compounded ten or fifteen years ago," according to Dr. L. E. Card, chief in poultry husbandry, University of Illinois, who contributed a section to the booklet.

Why Good Husbandry Pays Better Today Than Ever Before

Dr. Card emphasizes the fact that good husbandry has always paid in terms of better production.

"Good feeding, which is an important part of good husbandry, still pays today," he adds. "In fact, it probably pays better today than ever before because of improved stock which is capable of sustained high production, because of the trend toward all-pullet flocks which respond quickly to proper feeding, and because of widespread acceptance of the practice of starting chicks at the right time of year to take full advantage of the biological urge to lay."

Proof of Value of Sound Feeding Practices

Dr. Card cites data collected by the U. S. Department of Agriculture from more than 30,000 farmers as substantial proof of the value of sound feeding practices. The report shows that for the entire country the poultry ration in January, 1944, consisted of 33 per cent commercial mash, 12 per cent home-mixed mash, 24 per cent corn, 11 per cent wheat, 10 per cent oats. The remaining 10 per cent was made up of less common grains and commercial scratch feed.

"Thus, for the country as a whole, the ration was 45 per cent mash, but it varied by states from a high of 75 per cent to a low of 24 per cent," he says.

"The value of mash feeding is strikingly shown by figures on 'eggs per layer' each month for all states that reported 50 or more chickens per farm according to the census. These figures show that the states that fed less

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than 30 per cent of mash in the total ration in January had an average production in February of 10 eggs per layer. Those that fed over 60 per cent mash in January reported a February average lay of 16 eggs-- a difference of 6 eggs per layer, or 50 dozen for a flock of 100 hens. If mash cost 2 cents a pound more than grain, the feed cost of the extra eggs was less than 12 cents a dozen."

Hatcherymen and Breeders Give Reasons for Increased Egg Production

The booklet quotes the views of a number of representative hatcherymen and poultry breeders regarding causes for the tremendous increase in average egg production per hen.

H. Bernard Helms of Monroe, N. C., after outlining his ideas, concludes that "no matter how much breeding we put into these birds, it is the feeding and management that determines how far the breeding is brought out."

A. H. Rogers of Wahpeton, N. D., sums it up as follows: "Increased production is due to 70 per cent better feeding and management and 30 per cent better breeding."

G. E. Coleman, Jr., of Brunswick, Maine, summarizes the general consensus of opinions for the increase, which he says "was made possible by the following, listed in the order of their importance:

"Better distribution of good breeding stock to poultrymen throughout the country.

"Increased use of commercial feeds and supplements by poultrymen throughout the country which reflects newer and better knowledge of nutrition.

"Better housing and management for poultry throughout the country, which also reflects the increase in commercial production.

"Better disease control and increased emphasis upon pullorum eradication."

NOTE: For copy of the booklet reviewed above and for more information on poultry nutrition, especially on Du Pont's "Delsterol" "D"-activated animal sterol, write the Editor, Du Pont "Agricultural News Letter," Wilmington 98, Delaware.

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TWO GENERAL TYPES OF ANTI-FREEZE -- VOLATILE AND NON-EVAPORATING

Chemical anti-freeze that farmers and others use in their automobiles, tractors, and other automotive equipment are divided into two general types, the so-called volatile or low-boiling and the non-evaporating.

Du Pont anti-freeze chemists explain that the boiling point of the so-called volatile anti-freezes is below the boiling point of water (212°F.), while the boiling point of the non-evaporating type is above that figure.

Ethylene Glycol Has High Boiling Point. Is Non-Evaporating

"Zerex" -- The most satisfactory non-evaporating chemical is ethylene glycol, the active ingredient in Du Pont's "Zerex" anti-freeze. Many persons refer erroneously to non-evaporating anti-freeze as permanent.

"Because there is bound to be some loss from all cooling systems, no matter what type anti-freeze is used, manufacturers designate high-boiling-point anti-freeze as non-evaporating -- not as permanent," according to chemists in the Du Pont Ammonia Department.

They say that one filling with "Zerex" anti-freeze lasts all winter in a properly operating cooling system.

"This anti-freeze is made especially for use in high-opening thermostats and for severe operating conditions," they add. "Its special chemical inhibitor retards rust and corrosion and gives cooling solutions long-time anti-acid protection. It does not attack rubber, seep or creep from a tight cooling system, or clog radiators."

All Three Volatile Anti-Freezes Have About Same Boiling Points

"The major portion of the volatile anti-freezes now being offered to the public is of three types -- (1) methanol, (2) a methanol-isopropanol mixture, and (3) ethanol," the Ammonia Department chemists explain. "The weight per gallon (density) of all three is about the same; and for equivalent anti-freeze protection these solutions have approximately the same boiling points."

"Zerone" -- They point out, however, that quart for quart, methanol, the material used in Du Pont's "Zerone" anti-freeze, lowers the freezing point of the cooling-system solution more than other safe anti-freeze materials. Three quarts of "Zerone," for instance, will provide the same protection as four quarts of anti-freeze made from other safe materials. They explain that this is because methanol has smaller molecules, which means there are more molecules of methanol in a given quantity of anti-freeze.

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"It is not the size, but the number of molecules that lowers the freezing point," they say.

"Zerone" is designed for use with normal-opening thermostats (160°F. or below), on light or medium duty vehicles. Its special chemical inhibitor retards rust and corrosion, gives long-time anti-acid protection, and keeps a clean cooling system clean.

"Five Star" -- Du Pont produces "Five Star" ethanol-base anti-freeze that gives protection against freezing, excessive evaporation, corrosion, rust-clogged radiators, and engine overheating.

"Through the addition of other chemicals the desirable characteristics of ethanol are enhanced by creating unique properties not naturally possessed by ethanol," according to chemists in the Organic Chemicals Department, which manufactures this anti-freeze. They explain that in 1942, Du Pont was granted patent rights to an anti-freeze ingredient that reduces evaporation to such a point that little, if any, replacement is needed in a properly maintained cooling system.

"This exceptionally effective and tenacious evaporation retardant covers the anti-freeze solution with a surface film that reduces evaporation. The film is formed with a compound containing a chemical known as alkyl-C-betaine. Being non-emulsifying, the retardant is not completely dispersed when the motor is running. It quickly mends the broken liquid surface and continues to check evaporation.

"The chemical rust inhibitors incorporated in 'Five Star' are among the most efficient known, and a unique ingredient is used to prevent rust particles already present from adhering to the metal surfaces of the cooling system."

Inhibitors Help Overcome Rust Problems In Cooling Systems

Discussing this subject of rust inhibitors, the Ammonia Department chemists point out that water is used in automobile radiators because it is plentiful, economical, and a good cooling agent.

"However, water has two serious disadvantages: it freezes at relatively high temperatures, and it causes rust, corrosion, and scale," they say. "We add anti-freeze to lower the freezing point of water; and to help overcome the rust problem, inhibitors are added to the anti-freeze. When two anti-freezes of the same base are compared, the main difference in value lies in their rust-inhibiting properties. The extent to which the inhibitor helps prevent rust and corrosion is in some cases the real yardstick of anti-freeze quality."

The chemists say inhibitors may be classified as either mechanical or chemical.

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"The mechanical inhibitors generally are oils -- the chemical inhibitors are what their name implies, chemicals that delay the formation of rust. The theory underlying the use of mechanical inhibitors is that these oils will cover the inner walls of the cooling system and thereby protect it against contact with water and air. The chemical inhibitors react on metal to minimize rust."

Mechanical Inhibitor -- They continue: "The oils form droplets which suspend themselves in the water. These droplets tend to collect loose rust which may be in the system and paste it to the sides of the cylinder and radiator walls. Furthermore, oil inhibitors often cause swelling of hose connections made of natural rubber."

Chemical Inhibitor -- The chemical inhibitor is carefully selected to retard cooling-system metal corrosion.

"It will not harm rubber hose or gasket materials nor will it place on the metal surfaces an insulating film that tends to reduce the flow of heat from the cylinder walls to the anti-freeze solution. Further, it will help to hold in suspension any rust already present in the system, thus minimizing radiator plugging," they conclude.

NOTE: For booklets and leaflets on Du Pont's anti-freeze products "Zerone," "Zerex," and "Five-Star," write to the Editor, Du Pont "Agricultural News Letter," Wilmington 98, Del.

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NEOPRENE WASHERS SEAL NAIL HOLES IN METAL ROOFING AND SHEETING

Problems often encountered by farmers and others in the use of aluminum and other metals for roofing and siding -- leaks around nail holes and electrolysis -- can be solved by the use of new weatherproof nails made of aluminum and using neoprene washers. The washer forms a seal between the head of the nail and the aluminum or other metal sheeting and roofing, thus preventing leakage and corrosion due to electrolysis.

Neoprene is used because the Du Pont-made rubber will not get soft and mushy and run out from under the nailhead when exposed to the heat encountered on metal roofs. Neither will neoprene harden and chip out as a result of winter cold. Of the several types of rubber available, neoprene was chosen because of its excellent resistance to all forms of weathering -- heat, sunlight, ice, and rain.

NOTE: Names of companies supplying aluminum nails complete with neoprene washers will be sent on request. Address Editor, Du Pont "Agricultural News Letter," Wilmington 98, Del.

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